experimental. No serious side effects have been observed. Early side effects of pruritus, erythema and occasional nausea are infrequent. Theoretical long-term side effects of skin carcinogenesis, premature skin aging and ocular problems are being carefully monitored. No hepatic toxicity has been noted. Oral psoralens do not accumulate in the skin or other organs and are largely excreted within 12 hours in the urine.

PUVA offers potential benefit in a wide range of therapeutic applications to several chronic debilitating skin diseases.

NICHOLAS LOWE, MD, MRCP

REFERENCES

Melski JW: Tanenbaum L, Parrish JA, et al: Oral methoxsalen photochemotherapy for treatment of psoriasis: A cooperative clinical trial. J Invest Dermatol 68:328-335, Jun 1977

Roenigk HH Jr: Photochemotherapy for mycosis fungoides. Arch Dermatol 113:1047-1051, Aug 1977

Ortonne JP, Thivolet J, Sannwald G: Oral photochemotherapy in the treatment of lichen planus. Br J Dematol 99:77-88, Jan 1978

New Concepts in Virology of Warts in Humans

WARTS IN HUMANS are thought to be caused by human papilloma virus (HPA), a DNA virus of the papova group. The acronym papova is derived from the first two letters of the names of the members of the group, the other two being polyoma virus of mice and vacuolative virus of monkeys. HPV is not shown to be oncogenic in man but can produce benign tumors.

Warts present in a variety of clinically different manners. A few examples include filliform warts, flat warts, plantar warts, venereal warts, laryngeal warts and verruca vulgaris. It has been believed for a long time that the same virus is responsible for all of them. Recent studies have shed new light on the virology of warts in humans.

Delap and co-workers have shown that in condyloma acuminatum, DNA preparation did not have the same DNA sequences as HPV and that the virus-like particles were also antigenically different. Viruses isolated from hand warts, studied by restrictive enzyme analysis, showed that nucleotide sequences were different from HPV, which also had different polypeptide sequences in proteins as studied by immunodiffusion and immunofluorescence. Hansen and co-workers extracted DNA from plantar warts and transcribed radioactive complementary RNA using an Escherichia coli polymerase. The newly formed RNA amended specifically with plantar wart DNA and was used as a probe to study other wart virus DNA. While high concentrations of hybridizing DNA were found in plantar warts, the yield in verruca vulgaris was considerably low and negative in condyloma acuminatum and laryngeal warts.

Employing the technique of restrictive enzyme cleavage and polyacrylamide gel separation four types of human papilloma virus have been characterized. Some similarities are present in types 1 and 2 but type 3 and type 4 appear very different. The protein composition of the virus showed two very different proteins, designated types A and B.

These studies tend to support the hypothesis that, indeed, different viruses may be responsible for different warts and thus account for the remarkable heterogeneity in their clinical presentation and their variation in their response to therapy.

PAUL WOLFISH, MD

REFERENCES

Delap RD, Friedman-klen A, Rush MG: Absence of human papilloma viral DNA sequences in condylomata acuminata. Virology 74:268-272, Oct 1976

Orth G, Favre M, Croissant O: Characterization of a new type of human papilloma virus that causes skin warts. J Virology 24: 108-120, Oct 1977

Hausen H zur, Meinhof W, Scheiber W, et al: Attempts to detect virus-specific DNA in humon tumors—1. Nucleic acid hybridization with complementary RNA of human wart virus. Intl J Cancer 13:650-656, Jan 1974

Gissmann L, Pfister H, Zur Hausen H: Human papilloma viruses (HPV): Characterization of four different isolates. Virology 76: 569-580, Feb 1977

Characterization of Mycosis Fungoides Cells as Helper T Cells

CURRENT THINKING places mycosis fungoides in the category of thymus dependent (T cells) lymphomas. The erythrodermis and leukemic phase, called Sezary syndrome, is also characterized as a T-cell leukemia. Like T cells, cells infiltrating the skin in mycosis fungoides form rosettes with sheep red blood cells, have receptors for anti-T-cell globulin and lack surface immunoglobulins. Furthermore, they undergo blastogenesis when treated with mitogens like phytohemagglutinin or pokeweed mitogen and localize to T-cell zones of lymph nodes and spleens.

Several subsets of T cells have been recently described. T helper cells are those that stimulate and cooperate with B cells in immunoglobulin production. T-cell help may be specific or nonspecific and may be mediated by contact or solu-